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(54) **"Parametric audio system"**

(57) Ultrasonic signals are used to transmit sounds from a modulated ultrasonic generator (14) to other locations from which the sound appears to emanate. In particular, an ultrasonic carrier is modulated with an audio signal and demodulated on passage through the atmosphere. The carrier frequencies are substantially higher than those of prior systems, e.g. at least 60 kHz, and the modulation products thus have frequencies which are well above the audible range of humans; as a result, these signals are likely to be harmless to individuals who are within the ultrasonic fields of the system. The signals may be steered to moving locations, and various measures are taken to minimise distortion and maximise efficiency.

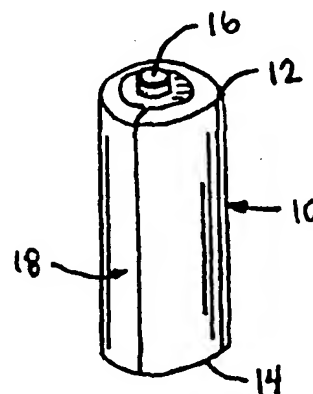


Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 5632

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 539 705 A (AKERMAN M ALFRED ET AL) 23 July 1996 (1996-07-23) * column 1, line 60 - column 2, line 56 * * column 6, line 26 - column 7, line 34 * * claim 1 *	1	G10K15/02 H04B14/00 G10K11/26
Y	---	10,15	
A	---	5,6,8	
X	US 4 823 908 A (TANAKA TSUNEO ET AL) 25 April 1989 (1989-04-25) * column 1, line 5 - column 2, line 62 * * column 4, line 20 - line 26 * * column 7, line 3 - line 9 * * column 9, line 39 - column 10, line 21 * * column 15, line 14 - line 17 *	17-20, 22,23,30	
Y	---	25,29	
Y	EP 0 420 500 A (CYBER SCIENT INC) 3 April 1991 (1991-04-03) * page 12, line 32 - line 53; claim 12 *	10,15, 25,29	
A	-----	12	TECHNICAL FIELDS SEARCHED (Int.Cl.7) H04B G10K
The present search report has been drawn up for all claims			
Place of search: THE HAGUE		Date of completion of the search 9 November 2000	Examiner Schneiderbauer, K
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/02 (Preliminary)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 30 5632

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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09-11-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5539705 A	23-07-1996	NONE	
US 4823908 A	25-04-1989	JP 61253996 A	11-11-1986
		JP 61264995 A	22-11-1986
		JP 62008699 A	16-01-1987
		JP 1996081 C	08-12-1995
		JP 7028462 B	29-03-1995
		JP 61057197 A	24-03-1986
		JP 1996082 C	08-12-1995
		JP 7028463 B	29-03-1995
		JP 61057198 A	24-03-1986
		JP 1866722 C	26-08-1994
		JP 5076839 B	25-10-1993
		JP 61123389 A	11-06-1986
		DE 3590430 T	18-09-1986
		WO 8601670 A	13-03-1986
EP 0420500 A	03-04-1991	US 4991148 A	05-02-1991
		CA 2024527 A,C	27-03-1991
		CA 2124180 A	27-03-1991
		CA 2124181 A	27-03-1991
		DE 69030908 D	17-07-1997
		JP 3146891 A	21-06-1991

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82